

SCORPION RANCH HOUSE BAT ASSESSMENT

Report prepared for National Park Service, Channel Islands National Park

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Introduction

Townsend's Big-eared Bat (*Corynorhinus townsendii*)¹ is an insectivorous, cavern-roosting bat noted for its very large ears and the peculiar, glandular lumps on either side of its rostrum (another common name for the species is the lump-nosed bat). There are two subspecies of Townsend's Big-eared Bat recognized in the western United States: the relatively pale *C. townsendii pallescens* distributed in the continental interior; and the coastal *C. townsendii townsendii*. The latter subspecies is the form that occurs in coastal California and on the Channel Islands.

Although Townsend's Big-eared Bat is broadly distributed across western North America, there is considerable concern about the status and trend of its populations because of the species' patchy distribution, reliance on large caves and similar sites for maternity roosts, and the sensitivity of colonies to disturbance. The two eastern subspecies of this bat are on the Federal Endangered Species list, and bat researchers and conservation agencies have expressed concern over decline and loss of populations in the western United States as well (e.g. Barbour and Davis 1969, Humphrey and Kunz 1976, Pierson and Rainey 1996). The coastal subspecies represented on the Channel Islands (*C. townsendii townsendii*) is a former Federal C2 candidate for listing under the Endangered Species Act, and is listed as a "Species of

¹ *Corynorhinus townsendii* has at times been included in the genus *Plecotus*. Following current taxonomy, *Plecotus* only refers to the European species in this group of bats, but the name is seen in some older literature on the North American species. In addition, some older sources did not distinguish the western (Townsend's) Big-eared Bat from the Eastern Big-eared Bat, *Corynorhinus rafinesquii*, so that name is also sometimes seen in older articles referring to western Big-eared Bats.

Special Concern” by the California Department of Fish and Game (California Department of Fish and Game 1986).

Townsend’s Big-eared Bats have been known from Santa Cruz Island since August 1939, when a colony estimated at over 300 individuals was found “in the attic of an old two-story building that formerly had been operated as a hotel at Prisoners’ Harbor.” At this time, a series of 111 specimens was collected from the colony (von Bloeker 1967). The Big-eared Bat colony at Scorpion Adobe has been present for at least the past eight years. It is possible that this colony moved to Scorpion from the site where Big-eared Bats were originally noted at Prisoners Harbor. That colony was occupying a similar adobe house, but the house at Prisoner’s Harbor was destroyed in 1960. It is possible that occupancy at the Scorpion Adobe dates back to the 1960’s (Ann Huston, Channel Islands National Park, per. comm. 19 November 2002).

The purpose of this study and report is to describe the current status of the Big-eared Bat colony at Scorpion Ranch, particularly in relation to planned renovation work on the structure. The report also summarizes the status of Big-eared Bats in the state of California, and discusses the significance of the Santa Cruz Island / Scorpion Ranch colony. Finally, the report provides discussion on minimizing impacts to the bat colony in the Scorpion Adobe.

Methods

Work for this project consisted of 1) gathering general background information on Townsend’s Big-eared Bat, and specific data for Santa Cruz Island, from published and unpublished sources; and 2) fieldwork on Santa Cruz Island. The field visit to Santa Cruz Island and the Scorpion Adobe was conducted on 5 November 2002, with Channel Islands National Park Archaeologist Ann Huston and other park staff. We arrived at the site at 12:30 pm, and examined the adobe and surveyed the surrounding valley area, until 5:00 pm. We inspected, measured, and photographed the Adobe site; examined the inside of the ‘bakery’ to determine where bats were roosting, assess relative abundance or intensity of use, and other aspects of the bats’ use of the site. We also searched around the outside of the ranch house and surrounding buildings for evidence of use by bats. Finally, we walked up and down the adjacent valley, and looked at other sites nearby known to have harbored bats, or that appeared to have potential. This included two shallow caves northeast of the Adobe, one of which was known to park staff to be used by Big-eared Bats.

The author and other USGS staff also conducted subsequent survey work on other parts of Santa Cruz Island from 28 – 30 June 2003. This included extensive call surveys to characterize bat species composition, distribution, and relative abundance of bats over all of Santa Cruz Island.

Results

The Scorpion Adobe is located in the broad lower (northern) end of Scorpion Valley at the east end of Santa Cruz Island, at approximate UTM 3770331 N, 263917 E. The structure is a two-story, rectangular building with a pitched roof. No bats were present in the building at the time of our visit. The summer Big-eared Bat roost is in the “bakery” room at the west end of the structure. This room is two stories tall, with only a partial “balcony” second floor above the south-facing entry door. A large brick oven occupies the entire back portion of the ground floor, against the north-facing wall. Internal dimensions of the room are approximately 10 ½ feet wide, by 14 feet deep (south wall to north wall, including the area occupied by the oven). The back (north) wall is approximately 21 feet high. The roof slopes downward from the north wall to the south wall (where the outside door is located), so that the inside height of the south wall is only about 17 feet. The ceiling of the room consists of 1” x 8” boards on top of a framework of 4” x 4” beams oriented north-south.

A thin layer of bat guano covers the flat top of the oven and the partial second floor above the entry door. A scattering of guano is also on the ground floor between the oven and the door. According to park staff (C. Schwemm, Resource Management), the open doorway is the only entrance and exit for the bats. The lower part of the door is closed at times to keep visitors out, so that the bats fly in and out through the upper half of the doorway. Temperature and humidity were recorded in the center of the bakery, and just below the ceiling in the area where the bats congregate (Table 1). The partial “balcony” floor above the doorway blocks much of the light entering through the open door, making the ceiling area where the bats roost much darker.

According to park staff observations, the bats only occur in the bakery room. This agreed with our examination of the rest of the building: there were a few scattered bat droppings (amidst more numerous deer mouse droppings) found in the other rooms on the second floor, but these were small and evidently not from Townsend’s Big-eared Bat. Judging by the size of the droppings, they were probably from one of the *Myotis* bats.

According to park staff observations, the Big-eared Bats occupy the bakery room from late April or May into September. Evening counts of the bats leaving the roost have been conducted in May and August for the last two years (Table 2). Bats have not been captured by park staff at this site, but only female Big-eared Bats are known to form aggregations during the summer (Kunz and Martin 1982, Pearson et al. 1952), so the colony is assumed to be an all-female maternity colony. Increased numbers seen in August of each year indicate successful reproduction in the colony.

In addition to guano on the floor and other flat surfaces of the bakery, there were also numbers of discarded moth wings, evidently representing food items taken by the bats in the colony. Wings in good condition were collected and later identified (see Table 3). The sample represented a variety of medium-sized moths, predominantly owlet moths of the family Noctuidae.

Discussion

Status of Townsend's Big-eared Bat

The overall rarity and declining population trend of Townsend's Big-eared Bat in California, and of the coastal subspecies in particular, has been well-documented. In a statewide survey, Pierson and Rainey (1996) estimated that the total number of female Big-eared Bats in the state has declined by over 50%. Of former big-eared bat roosts in buildings and houses that were revisited, nearly 90% (15 of 17) had been demolished, destroyed by fire, or otherwise made unavailable for bats (Pierson and Rainey 1996). Even for seemingly stable cave and mine roosts, only half were still being used (12 of 24 for caves, 6 of 14 for mines). Some of the cave and mine sites no longer being used had their entrances closed, or had collapsed. Most of the unused sites, however, appeared to still be suitable for roosting, but received moderate or high levels of disturbance by people.

Loss of former maternity colonies appears to be most acute in coastal southern and central California. Of 14 previously-known maternity colonies in coastal California from San Francisco Bay south to the Mexican border (immediate coast and Coast Range mountains, not including the Santa Cruz Island colony), only three were found to be still active by Pierson and Rainey (1996). Because of declines of the species in southern California, and the relative importance of the Santa Cruz Island colony, Pierson and Rainey (1996) assigned the island roost "Priority 1" status. Prior to this, the California Department of Fish and Game had already listed Townsend's Big-eared Bat as a "Species of Special Concern" in the state (California Department of Fish and Game 1986).

The Santa Cruz Island colony had declined substantially from the time it was originally reported (200 to 300 individuals, 1939 to 1948; von Bloeker 1967) to the early 1990's (65 individuals, Pierson and Rainey 1996). It is noteworthy that the colony has shown a sizable increase (to 80-100 individuals; Table 1) in the time that the area has been protected by the Nature Conservancy and National Park Service. Pierson and Rainey (1996) noted that the only three colonies where they found increased numbers were also in National Parks (Point Reyes National Seashore and Lava Beds National Monument).

Rehabilitation and Renovation of the Scorpion Ranch House

Channel Islands National Park is well along in planning for repair and renovation of the historic Scorpion Ranch structure. Rooms on the first and second floor of the east end of the building (i.e. not including the bakery) are to be cleaned and renovated for a visitor contact facility, office space, and storage space. The work will include retrofitting the structure so that it meets earthquake safety codes. Construction is planned to begin in fall 2003.

The following aspects of the ecology and natural history of Townsend's Big-eared Bat are important as background for the planned work on the Scorpion Adobe:

- 1) The maternity period of the species in California lasts from April to mid-September, with single young born in May or June (Jameson and Peeters 1988; Pierson and Rainey 1996);
- 2) Nursery colonies are in large caves, mines, and buildings (Jameson and Peeters 1988; Pearson et al. 1952);
- 3) Townsend's Big-eared Bat is relatively sedentary, both during the reproductive season, and when moving to hibernation sites; marked individuals have not been recorded moving more than 43 km to reach hibernation sites (Humphrey and Kunz 1976, Pierson and Rainey 1996);
- 4) Many sources note that these bats appear to be very sensitive to disturbance at their maternity roosts, and this is thought to be one of the primary reasons for the species' decline; a single intrusion into an

occupied cave or other maternity roost area may be enough to cause the colony to move (Humphrey and Kunz 1976, Pierson and Rainey 1996);

Recommendations

Planned renovation of the Scorpion Ranch House should be compatible with maintaining the important maternity colony of Townsend's Big-eared Bats in the structure, if the following guidelines are followed:

- 1) No work should be done on the interior of the bakery room until after the bats have left for the fall;
- 2) No loud, jarring work should be conducted on the exterior of the building until after the bats have left. This would include use of machinery adjacent to the building, or digging around the building, or any work on the exterior that might cause substantial noise or vibration;
- 3) Work on the structure should not include changes that affect the amount of light entering the bakery room, nor should it change the temperature and humidity within the room. Such changes would include addition of windows, vents, or modifications that would significantly affect the airflow into and through the room.
- 4) The interior surface of the ceiling, where the bats cluster when they are using the room, should not be covered over or significantly modified.
- 5) Monitoring of bat numbers at the colony should be continued on an annual basis. The May / August schedule provides good information on the number of adults at the start of the summer, and the approximate number of young surviving to the flying stage.
- 6) Temperature and humidity inside the bakery room should be monitored, to assure that these are not changed significantly by the renovations that are done. This may best be accomplished with the use of a temperature and humidity data logger placed near the ceiling area.

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Table 1. Temperature and humidity measured in two roost sites of Townsend's Big-eared Bat in Scorpion Valley, Santa Cruz Island. The bakery room in the Scorpion Adobe is the site of a maternity roost of the bats; the cave is an alternative roost site, or a night roost (see text).

	Temperature (C)	Humidity (%)
Scorpion Adobe, bakery		
Center of room (2:30 pm)	18.6	68
Just below ceiling, above door (3:00 pm)	19.4	66
Shallow cave 30 m NE of Scorpion Adobe		
Back of cave, 1 m high (4:15 pm)	17.1	69

Table 2. Numbers of Townsend's Big-eared Bats at Scorpion Ranch House. Data are from exit counts conducted in early evening by National Park Service personnel (Cathy Schwemm, CHIS, pers. comm.). Spring counts do not include young of the year; summer counts should include recently-fledged young.

	Spring	Summer
2001		
May 27	50	
May 28	80	
August 24		123
August 25		124
2002		
May 25	105	
August 16		129
August 17		117

Table 3. Food remains (all moths, order Lepidoptera) recovered from Townsend's Big-eared Bat roost at Scorpion Ranch House. Numbers are based on left or right front wings (whichever was more numerous) of the species listed. Species identifications noted as "(?)" are tentative, pending comparison with museum material.

Family Arctiidae – Tiger Moths

Apantesis (= Notarctia?) sp. 1

Family Geometridae – Geometrid / Inchworm Moths

Pero sp. (?) 1

Family Noctuidae – Owlet Moths

Autographa sp. (?) 3

Euxoa sp. (?) 9

Heliothis sp. (?) 3

Pseudaletia unipuncta 2

unidentified sp. 2 or 3